



# Peak Demand Impacts of TOU Rates and Customer Access to Usage Data (RTEM)

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# 1. RTEM Background

- ❑ 25,000 advanced meters installed – 9/01-6/02
  - All customer accounts  $> 200$  kW
  - Most at SCE, PG&E and SDG&E
- ❑ Customers  $< 500$  kW moved to TOU rate
- ❑ Access to usage data
  - Utilities designed web interfaces
  - Customers may access previous day's usage
  - Some utilities offer additional features for fee
- ❑ Original intent – offer RTP to achieve demand response

## 2. Analysis of RTEM at SCE

- ❑ SCE phone survey of RTEM customers (May 2003)
- ❑ SCE provided data for survey sample (300)
  - Survey responses
  - Hourly load data since installation
  - SIC and ZIP code
  - History of connections to web site
- ❑ Christensen Associates conducted analysis of load data for CEC evaluation project

# Features of RTEM at SCE

- ❑ Customers 200 – 500 kW (*7,000; 1,900 MW*)
  - New meters and access to web
  - Assigned to new TOU rate (GS2-T)
  - Customers in sample -- 164
- ❑ Customers > 500 kW (*2,900; 3,500 MW*)
  - Already had interval meters (no web access)
  - Already faced TOU prices (*e.g.*, TOU-8)
  - Customers in sample -- 78

# Customer Survey Results -- SCE

- If no accounts, why not using?
  - Not aware of it 52%
  - Not needed/have own system 19%
  - No time, haven't gotten to it 13%
- Reported load shifting using SCE EM:
  - Shifted kWh away from On-peak 39%
  - Reduced overall kWh 39%
  - Reduced costs 48%

# Customer Survey Results (cont.)

- How often does someone access data?
  - At least once per day 15%
  - At least once per week (not daily) 29%
  - At least once per month 27%
  - Only for specific need 26%

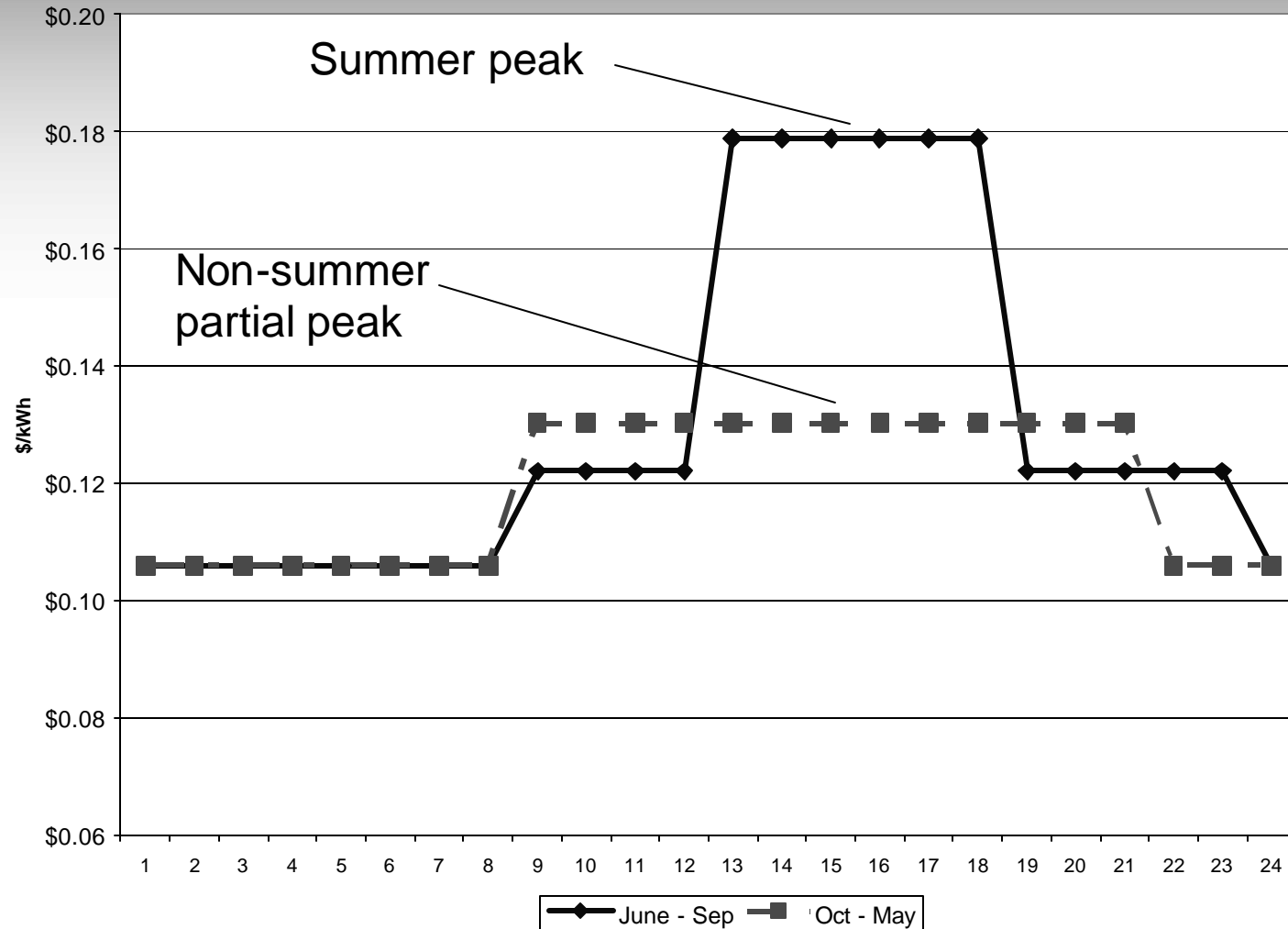
# 3. Analysis Approach

## *Complications for Load Response Analysis*

- ❑ Not *experiment* – meters installed for all
- ❑ No *control group*
- ❑ No “*before/after*” data – no prior metering
  - (Available in principle for  $> 500$  kW, but not provided)
- ❑ No *price variation* – one TOU rate
- ❑ Variety of business types and loads

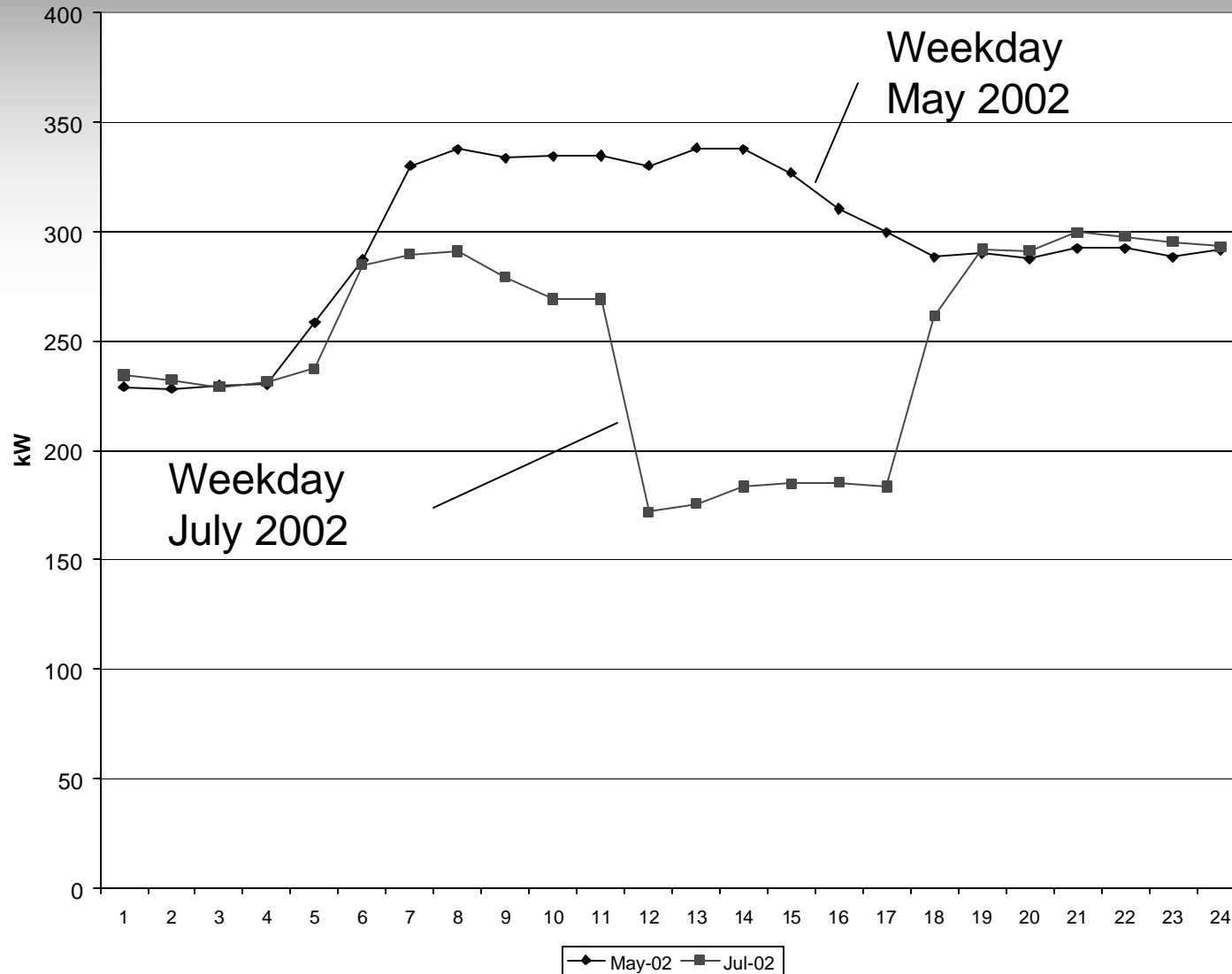
# TOU Rate Structure

## *GS2-T TOU Energy Prices*



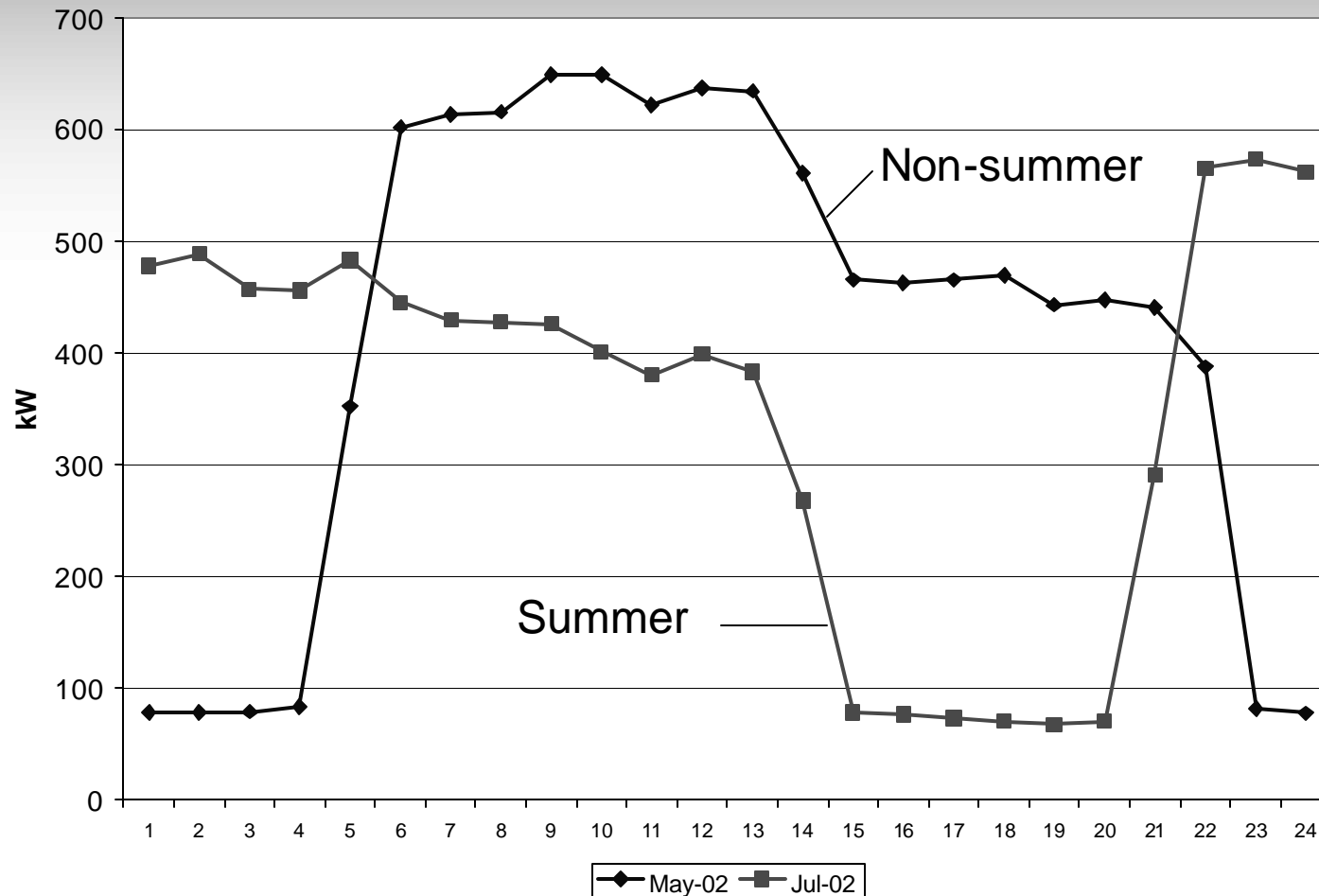


# TOU Peak Demand Response – *GS2T Plastics Manufacturer*



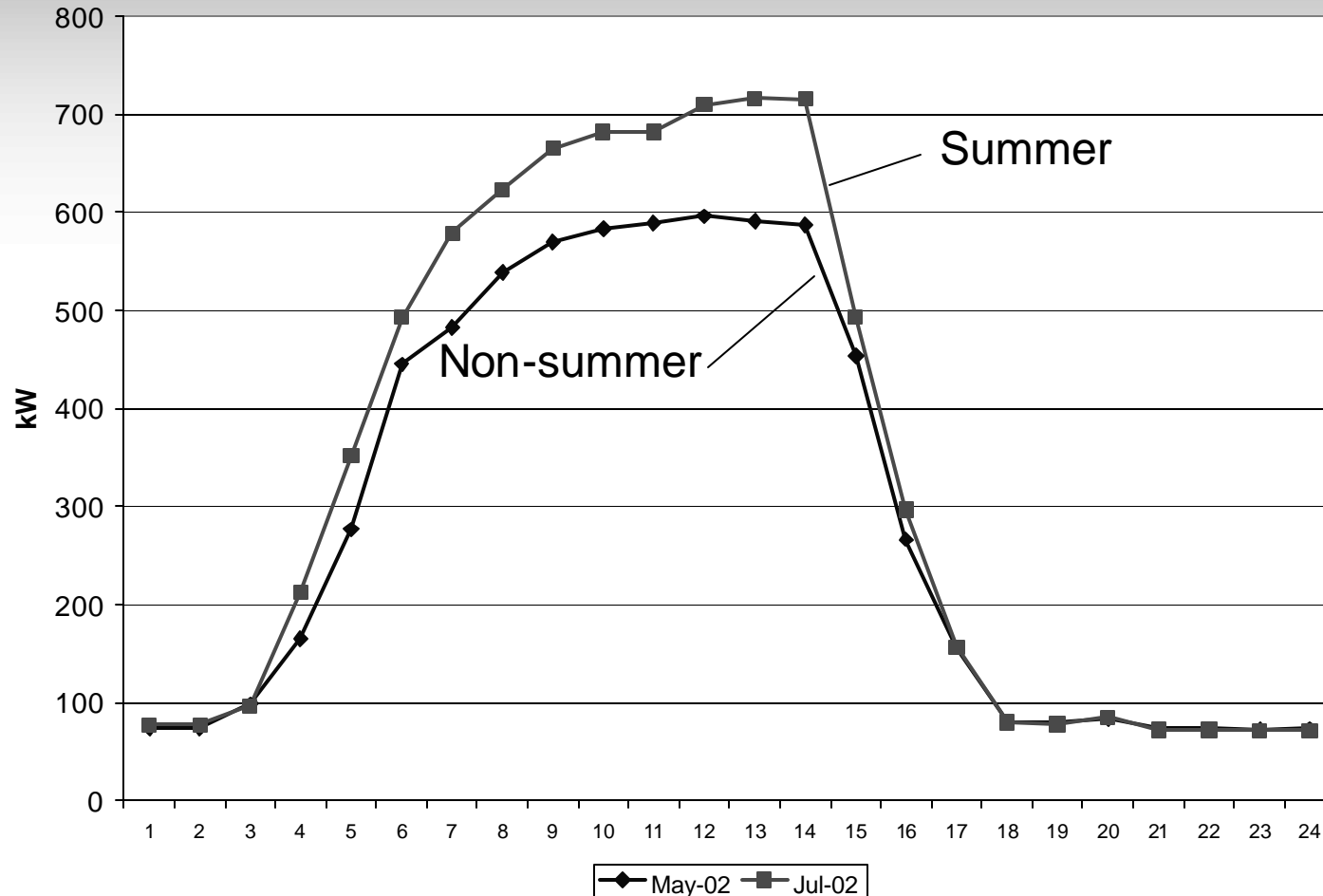
# Peak Demand Response

## TOU-8 Customer – *Fabricated Metal*



# Price Response?

## TOU-8 *Instrument Manufacturer*



# Analysis Approach

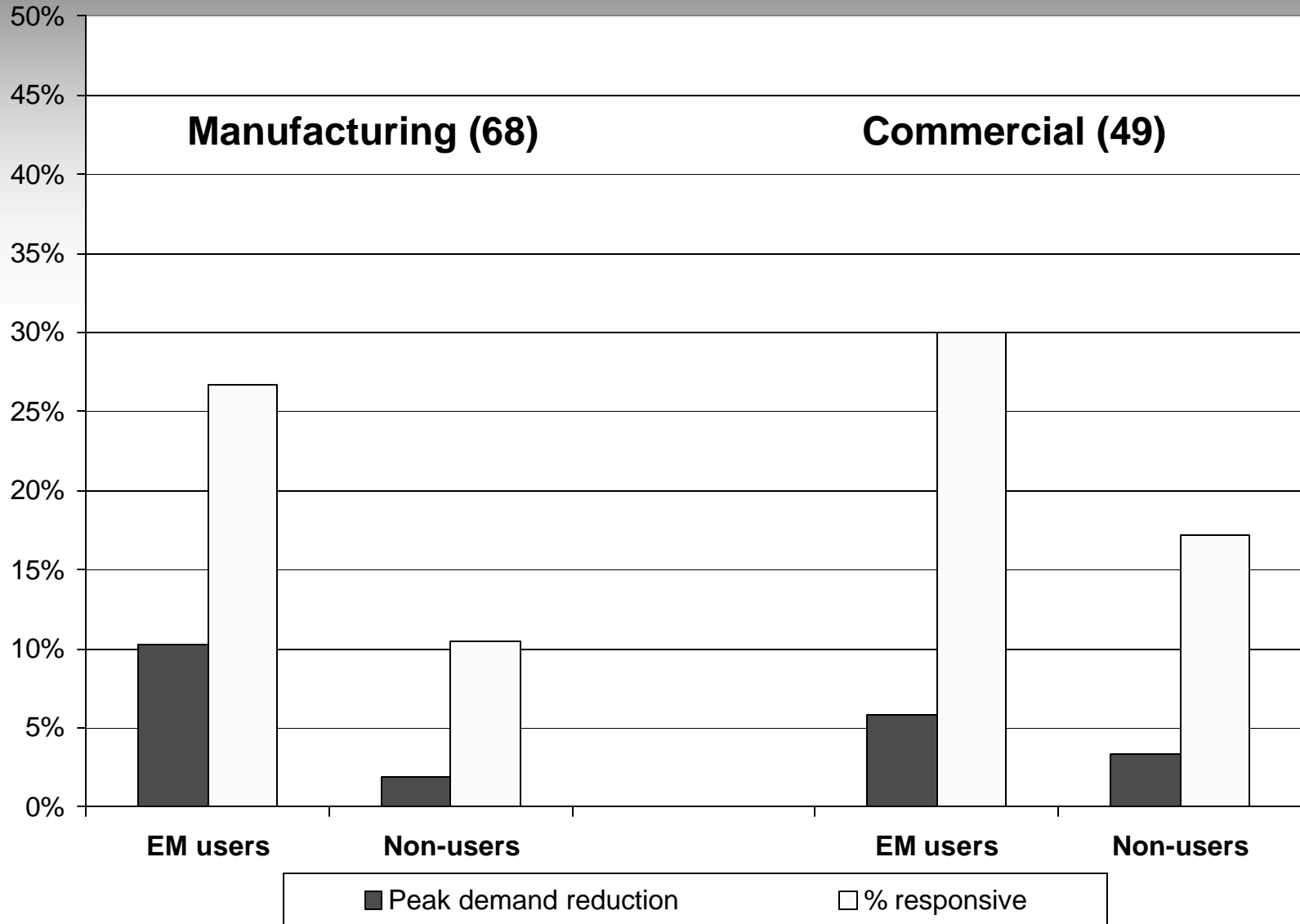
## *Measuring TOU Price Response*

- Use customers' own peak-period usage in *non-summer* (NS) months as *control*
- TOU price response =  $Q_{\text{Peak}}^{\text{NS}} - Q_{\text{Peak}}^{\text{S}}$ ,  
[Change in *peak period usage* (6-hr Sum peak),  
controlling for effect of weather and other factors]
- Examine differences in price response
  - By *business type* (manufacturing/commercial)
  - By *survey responses* and recorded *web usage*

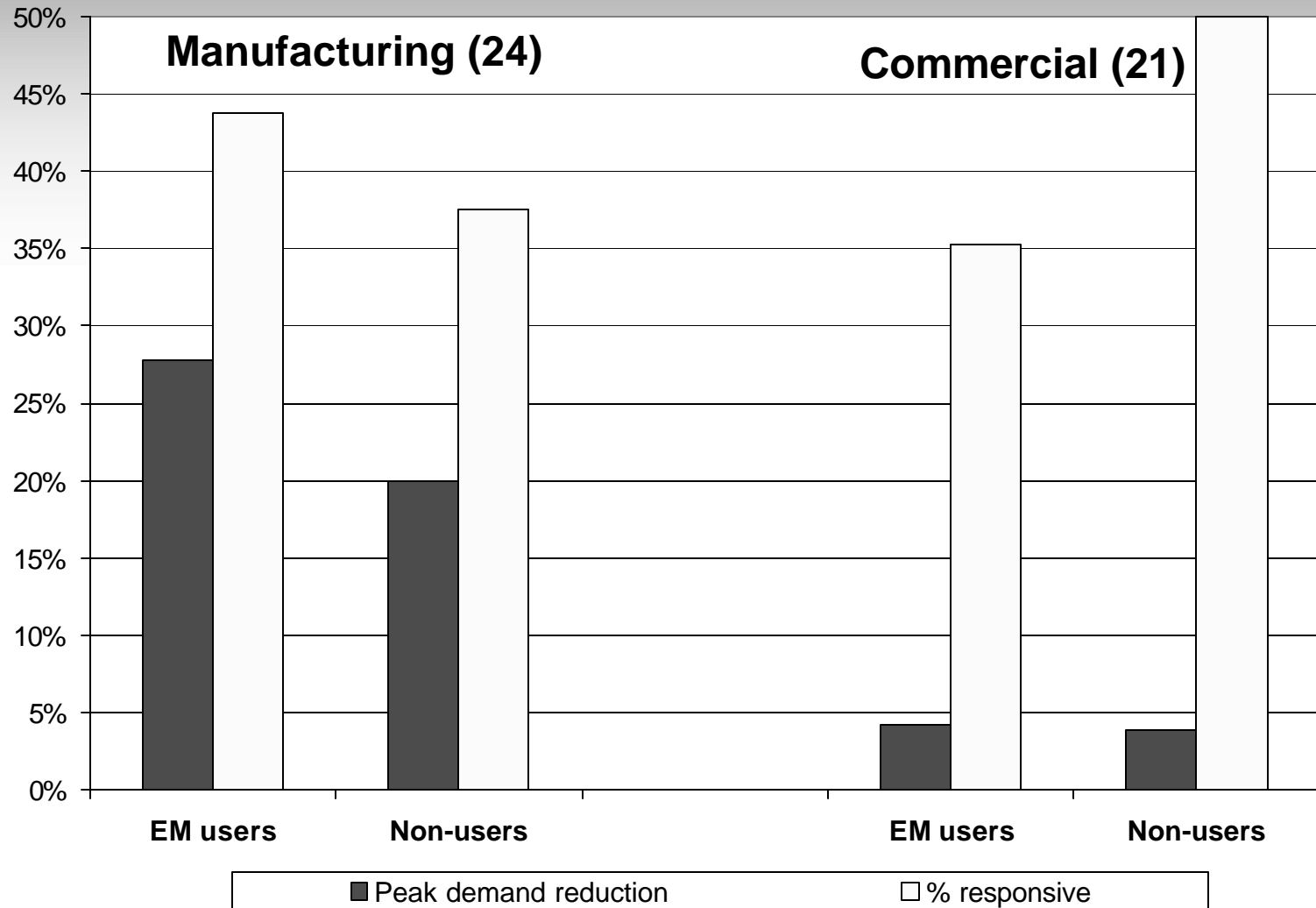
# Data and Econometric Methods

- ❑ Daily observations on usage by TOU
- ❑ *Time period*: Approx. April '02 – Oct. '03
- ❑ Pooled data for *Manufacturing* (SIC 20 – 40) & *Commercial* (SIC 50 – 70)
  - Pooled, fixed-effects regressions
  - Individual customer regressions
- ❑ Separate equations by TOU period
  - Usage levels (average kWh/hr)
  - Usage shares

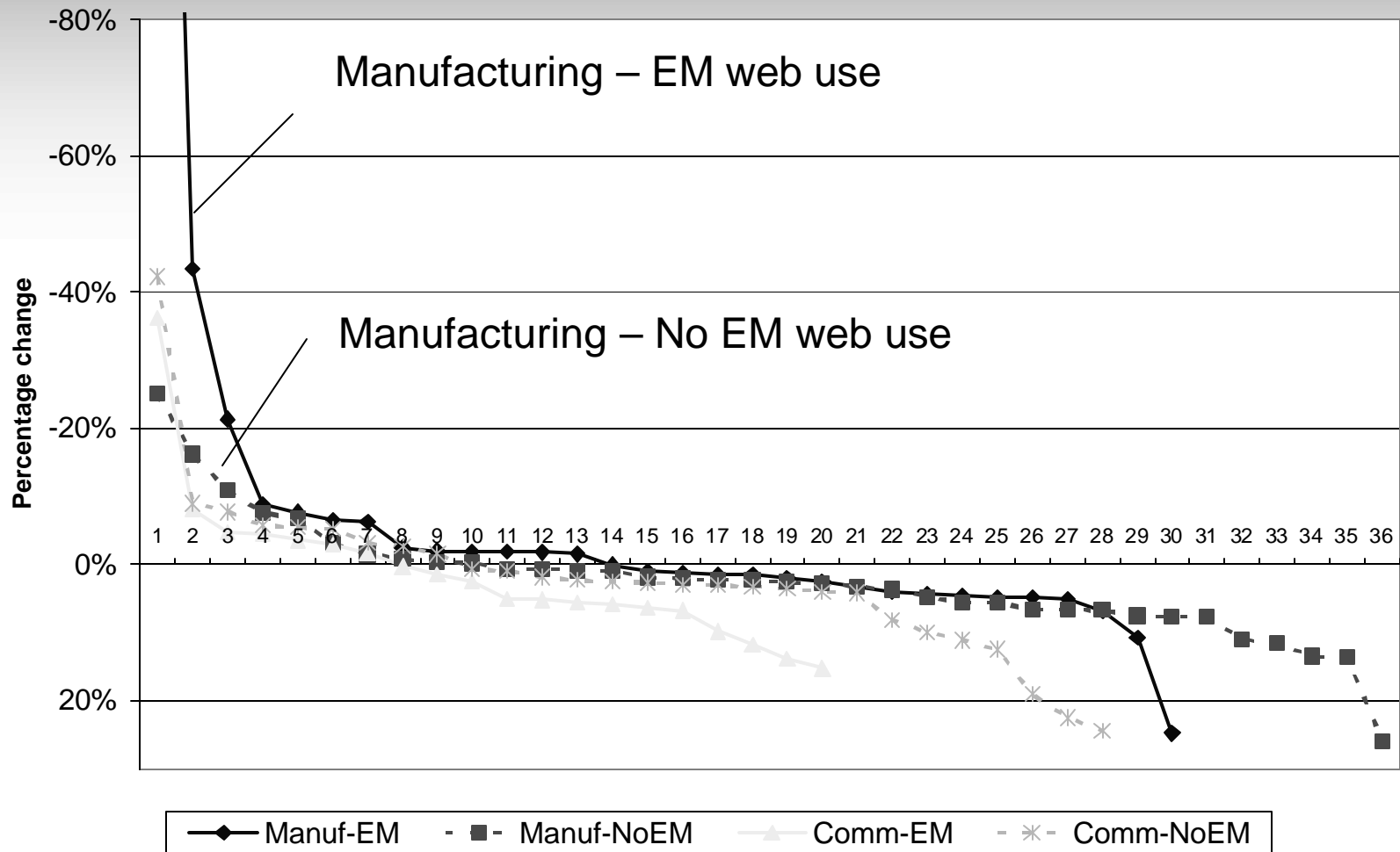
# Summer Peak Demand Reductions – by Use of EM Website (*GS2T*)



# Summer Peak Demand Reductions – by Use of EM Website (*TOU-8*)

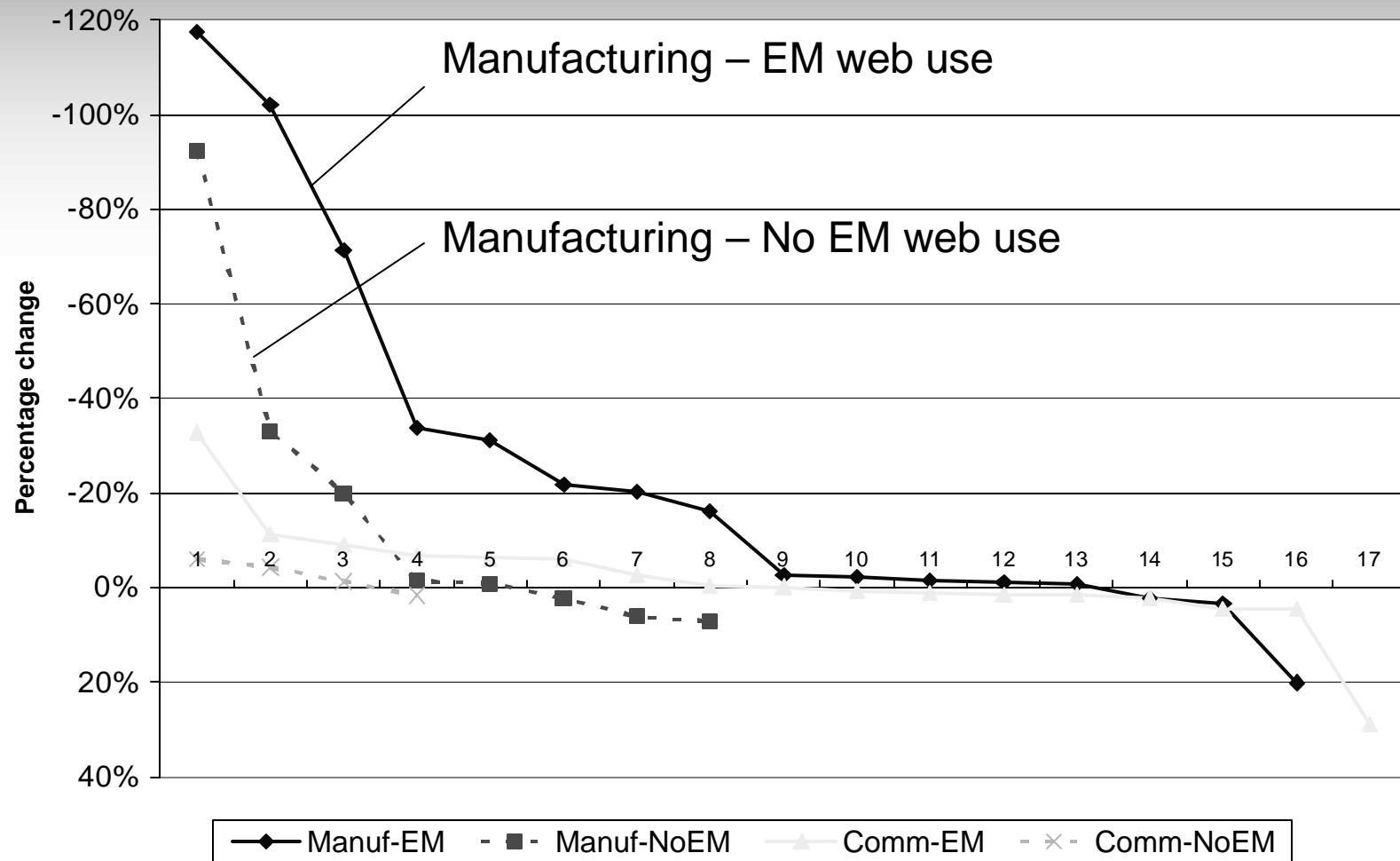


# Distribution of Summer Peak Demand Reductions – *GS2T*





# Distribution of Summer Peak Demand Reductions – *TOU-8*



# Preliminary Conclusions

- ❑ *GS2T* – Small but measurable summer peak demand response (2 – 10%)
  - Manufacturing substantially more responsive
  - EM website users somewhat more responsive
- ❑ *TOU-8* – Substantial summer peak demand response (4 – 25%)
  - Manufacturing much more responsive
  - EM website users somewhat more responsive

# Parting Thoughts on Value of *Dynamic vs. TOU Pricing*

- ❑ TOU peak prices represent *average* peak energy costs – apply *every summer weekday*
- ❑ Daily peak energy prices *vary substantially*
- ❑ The most responsive TOU customers reduce peak usage *almost every day*
  - Perfect candidates for *dynamic pricing* that affects only handful of critical days
  - Could reduce their costs of deferring usage on days when peak energy costs are actually low

# TOU Peak Prices vs. Daily Wholesale Costs

*(SP-15 Ex-post prices, Summer 2003)*

